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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/668,255

09/24/2003

Thomas J. Hunt

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EXAMINER

STONER, KILEY SHAWN

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

06/30/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/668,255	Applicant(s) HUNT ET AL.	
	Examiner KILEY STONER	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 3 and 6-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With respect to claim 3, the specification provides support for a plurality of segmented and spaced-apart “arcuate-shaped” ridges, but fails to provide support for a plurality of segmented and spaced-apart “circle, square, rectangular, polygon and combination thereof” shaped ridges. This constitutes new matter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-11 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Ogata et al. (JP-402043362A) (hereafter Ogata).

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Ogata teaches a disc shaped sputter target/backing plate assembly made by forming a plurality of segmented and spaced-apart ridges (3) within the surface of the periphery of the bonding surface of the backing plate (1) (Abstract; and Figures 2(1) and 2(2)). The ridges of Ogata inherently act as spacers/standoffs for the supply of soldering material between said backing plate and a sputter target. Ogata also teaches forming a sputter target with a substantially flat sputtering surface (2) and bonding surface, applying solder material (4) to the interface spaces and allowing the solder to solidify to form a bond (abstract and figure 1). Ridges are circular, arcuate (identified as semicircular in the abstract) or polygonal (figures 3-1 to 3-4) with heights and widths of about 0.02 to about 0.06 inches with a distance between ridges (pitch) of up to about 0.4 inches (abstract). Columns 7-8 of Ogata teach known soldering alloys.

Claims 1, 3, 4, 13, 14, 18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukumoto et al. (JP-411200028A) (hereafter Fukumoto).

With respect to claim 1, Fukumoto teaches a method for forming a solder bonded sputter target/backing plate assembly comprising the steps of: a) forming a backing plate (#2,#3) with a bonding surface having a plurality of segmented and spaced-apart ridges (figure 2, #3) that are disposed on and within the periphery of the bonding surface of the backing plate, which perform as spacers/standoffs for the supply of solder material between said backing plate and a sputter target (#1); b) forming said sputter target having a sputtering surface and substantially flat bonding surface (figure 3); c) applying said solder material (#6) to the interface spaces defined by superimposing said

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sputter target within the periphery of and onto the plurality of ridges on the backing plate; and d) allowing said solder material to solidify and bond the sputter target to the backing plate so that the plurality of ridges provide an effective uniform thickness solder bonded interface (figure 3). In addition, Fukumoto states that since a tape spacer is being beforehand fixed to the back up plate in a manufacturing method of this invention, when joining a target material, there is no possibility that a position of a tape shape spacer may shift, and workability is good (paragraph 17).

With respect to claim 3, Fukumoto teaches wherein the ridges on the bonding surface of the backing plate have a shape selected from the group comprising a circle, arcuate, square, rectangular, polygon and combination thereof (figures 2, 4 and 5).

With respect to claim 4, Fukumoto teaches wherein the height of the ridges is between about 0.005 inch and about 0.050 inch (paragraph 11).

With respect to claim 13, Fukumoto teaches wherein the backing plate is selected from the group comprising copper, aluminum, titanium, and alloys thereof (paragraphs 2 and 9).

With respect to claim 14, Fukumoto teaches wherein the solder is liquid or paste and selected from the group comprising tin-lead, indium-tin, tin-silver, tin-copper, or tin-silver-copper (paragraph 2).

With respect to claim 18, Fukumoto teaches a solder bonded sputter target/backing plate assembly comprising a backing plate (#2,#3) having a plurality of segmented spaced-apart ridges (figure 2, #3) disposed on and within the periphery of

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the bonding surface of said backing plate, which perform as spacers/standoffs upon supplying a solder material between said backing plate and a sputter target (#1); said sputter target having a substantially flat sputter surface and a bond surface; said sputter target superimposed onto the plurality of ridges on the bonding surface of the backing plate (figure 3); and a solder bonded layer (#6) disposed between the sputter target and backing plate and between the ridges producing an effective uniform thickness solder bonded interface for the sputter target/backing plate (figure 3).

With respect to claim 20, Fukumoto teaches wherein the bonded solder is selected from the group comprising tin-lead, indium-tin, tin-silver, tin-copper, or tin-silver-copper (paragraph 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12-17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (JPN 02-43362A) in view of Ivanov (US 20050284749 A1).

Ogata teaches a disc shaped sputter target/backing plate assembly made by forming spaced apart ridges (3) within the surface of the backing plate (1), forming a

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sputter target with a substantially fiat sputtering surface (2) and bonding surface, applying solder material (4) to the interface spaces and allowing the solder to solidify to form a bond (abstract and figure 1). Ridges are circular, arcuate (identified as semicircular in the abstract) or polygonal (figures 3-1 to 3-4) with heights and widths of about 0.02 to about 0.06 inches with a distance between ridges (pitch) of up to about 0.4 inches (abstract). Column 8 paragraph 2 of the patent teaches use of an Ag/Cu material. However the target and backing materials are not disclosed. Neither is the solder clearly disclosed.

Ivanov teaches bonding of a target comprising Ta, Al, Ag, Cu, Ti, Ta, Co or Ni and a backing plate comprising Al, Ti, Cu and their alloys (paragraph 39), which, are conventional materials. The solder comprises Sn-Ag-Cu (paragraph 33).

At the time of the invention it would have been obvious to one of ordinary skill in the art to use conventional target and backing plate materials with a conventional solder such as Sn-Ag-Cu to form a reliable connection when bonding sputtering assemblies, particularly assemblies comprising Ag and Cu.

Claims 5, 12, 15-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukumoto.

With respect to claim 5, Fukumoto teaches a preferred width of 5-30 mm is preferred, but does not explicitly teach that the width of the ridges is between about 0.005 inch and about 0.050 inch. However, it is the examiner's position that it would have been obvious to one of ordinary skill in the art at the time the invention was made

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to set the width of the ridges between about 0.005 inch and about 0.050 inch, since it has been held that discovering an optimum value or a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The artisan would have been motivated to set the width of the ridges between about 0.005 inch and about 0.050 inch by the reasoned expectation of forming a satisfactory bond. Where the general conditions of the claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. (*In re Aller*, 220 F.2d 454, 456 (CCPA 1955)).

With respect to claims 12, 15 and 19, Fukumoto is silent with respect to the material of the sputtering target; however, at the time of the invention one of ordinary skill in the art would have recognized that titanium, aluminum, copper, molybdenum, cobalt, chromium, ruthenium, rhodium, palladium, silver, iridium, platinum, gold, tungsten, silicon, tantalum, vanadium, nickel, iron, manganese, germanium, and alloys thereof could be successfully bonded to a copper sputtering target. In addition, the examiner takes Official Notice that it is well known in the art to utilize sputter targets selected from the group comprising titanium, aluminum, copper, molybdenum, cobalt, chromium, ruthenium, rhodium, palladium, silver, iridium, platinum, gold, tungsten, silicon, tantalum, vanadium, nickel, iron, manganese, germanium, and alloys thereof (note the teachings of Ivanov).

With respect to claim 16, Fukumoto is silent with respect to the material of the sputtering target; however, at the time of the invention one of ordinary skill in the art would have recognized that cobalt, nickel, and alloys thereof could be

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successfully bonded to a copper sputtering target. In addition, the examiner takes Official Notice that it is well known in the art to utilize sputter targets selected from the group comprising cobalt, nickel, and alloys thereof (note the teachings of Ivanov).

With respect to claim 17, Fukumoto teaches wherein the height of the ridges is between about 0.010 inch and about 0.030 inch and the thickness of the width of the ridges is between about 0.010 inch and about 0.030 inch (paragraph 17).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukumoto as applied to claim 1 above, and further in view of Hunt et al. (US 6,073,830) (hereafter Hunt).

With respect to claim 2, Fukumoto fails to teach that the backing plate and sputter target are disc-shaped; however, Hunt teaches that the backing plate and sputter target are disc-shaped (figures; and column 9, lines 4-8). At the time of the invention it would have been obvious to utilize the spacers of Fukumoto with the disc-shaped sputter target/backing plate assembly in order to prevent warping of the assembly during bonding.

Response to Arguments

Applicant's arguments filed 5/4/09 have been fully considered but they are not persuasive.

The applicant argues that that Ogata does not teach the solder bonding method of the present invention, but rather a brazing bonding. The examiner respectfully

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disagrees. The abstract of Ogata states "brazing", but a closer look at the specification (columns 7 and 8) of Ogata clearly indicates that soldering is the bonding process being used. Specifically, Ogata teaches Sn-Ag and Sn-Pb compositions in column 7 and a 90Sn-10Ag (wt%) composition with a melting temperature of 260°C in column 8. These are soldering compositions. The examiner pointed this out to the applicant in the previous Office action; however, the applicant failed to argue that the compositions set forth in columns 7 and 8 of Ogata are not soldering compositions.

In addition, the applicant argues that Ogata does not disclose raised protrusions in the form of segmented spaced-apart ridges on the bonding surface of the backing plate. The examiner respectfully disagrees with the applicant's position as Figures 2(1) and 2(2) clearly depict the claimed ridges (also note that the abstract describes stripe and checker grooves). Furthermore, the ridges of Ogata inherently act as spacers/standoffs for the supply of soldering material between said backing plate and a sputter target.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiley Stoner whose telephone number is 571-272-1183. The examiner can normally be reached Monday-Thursday (9:30 a.m. to 8:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Kiley Stoner/

Primary Examiner, Art Unit 1793